Z. Säugetierkunde 56 (1991) 146–158

ISSN 0044-3468

Reproduction in the European lynx, *Lynx lynx*

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Receipt of Ms. 10. 7. 1990
Acceptance of Ms. 20. 11. 1990

Abstract

Based on skinned carcasses collected in Norway from 1960 through 1976. The mating period lasted from February through early April, with a peak of mating activity in March. Parturition occurred in late May and early June. Normal litter size was 2–3. Males were normally sexually mature at 2¾ years of age, but some males were mature at 1¾ years of age. Females were sexually mature at 1¾ years of age, but the investigation also indicated maturation in approximately 50 % of the females at ¾ years of age.

Introduction

Reproduction is one of the major factors controlling development of the population structure. Since population biology of the European lynx, *Lynx lynx*, has not been studied closely before, and these aspects are very important for management purposes, it was mandatory from 1960 to 1980 for the payment of the Norwegian state bounty on lynxes that all skinned carcass be sent to the Directorate for Nature Management for investigation and assessment. This investigation is based on samples accumulated from 1960 through 1976.

Material and methods

The investigated material comprised testes from 149 males and reproductive tracts including ovaries from 176 females. Embryos from 8 reproductive tracts were also examined. Since the reproductive organs has been stored in 70 % ethanol for a number of years, they were very hard and shrunken, and were therefore not suitable for immediate sectioning. In an effort to soften tissues and aid rehydration the material was treated with a mixture of 2/3 glacial acetic acid and 1/3 glycerol (Baker 1966). A solution consisting of equal parts of 1 % trisodium phosphate and 10 % sodium hydroxide was used to induce swelling of the organs and to stabilize them for sectioning as well as to neutralize the effect of acetic acid (Cleave and Ross 1947; Löwegren 1960).

Analysis of testes

Due to partial decay as well as a result of storage in 70 % alcohol, the testes material was in very bad histological condition. Microscopic observation of sperm and spermatids was very difficult. Fertility could be decided by this method in only a few cases.

Testes of seasonal breeders normally vary in size and weight with the reproduction cycle of the species. They are normally also larger and heavier in sexually mature animals than in the immature (Nalbandov 1976). The testes were weighed after the swelling process. They were impossible to separate from the surrounding tissue before swelling. In this paper testes weight means weight of testes including epididymis and tunica vaginalis. Some pairs of testes were very different in size as only one testicle was functional. Weight of the largest testicle in one specimen has therefore been used in the following comparisons, referred to as testis weight.

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Analysis of ovaries

Ovaries were macroscopically examined for form, colour, size and stage of development, then sectioned with a freezing microtome and stained with Heidenhain's haematoxylin (ROMEIS 1948; BAKER 1966). Sections were analysed with a microscope, and Graafian follicles and corpora lutea were counted. Fresh luteal bodies are found throughout the year. Normally they are easily recognizable from luteal bodies of the previous cycle (CROWE 1975) based on difference in colour and consistency. Fresh luteal bodies are light yellow. One year later, when they turn into "lutein bodies of the previous cycle", they are red-brown or gray with a significantly less granular appearance than fresh luteal bodies. Luteal bodies from three cycles have been observed in eight cases. Ovulation rates were calculated by counting the fresh luteal bodies and Graafian follicles in ovaries (CHEATUM 1949; DUKE 1949; GASHWILER et al. 1961).

Analysis of uterine tracts and embryos

Uterine tracts were opened lengthwise and held up to a bright light to ascertain the presence of placental scars and evidence of resorbing embryos (SAUNDERS 1961). This method proved inappropriate for histological inspection of the present material, due to damage by shrinking after storing in 70 % alcohol. The reproductive tracts smaller than 40 g were induced to swell along with the ovaries. They were weighed after storage in 8 % formaldehyde for one year after swelling. Obviously pregnant reproductive tracts, heavier than 100 g were not induced to swell, since due to storing in formaldehyde they were not shrunken. Embryos were weighed and crown-rump lengths were measured in the manner described by AREY (1965).

Age of embryos

Approximate age of embryo litters was determined by comparing weights and lengths with a prenatal growth curve prepared for the Canada lynx from Newfoundland *Lynx canadensis subsolanus* by SAUNDERS (1961). His table on development of embryos of known age in domestic cats *Felix catus* based on data from DAWSON (1941), WINDLE and GRIFFIN (1931), CORONIOS (1933) and WORDEN and LANE-PETER (1957), was established for aging the Canada lynx embryos of unknown age. With approximate age of litters established, it was possible to calculate approximate dates of conception and parturition. In these calculations the gestation period was considered to be 70 days (LINDEMANN 1955).

Masting period

The period of reproductive activity was determined by comparing time of the year with weights of testes, ovaries and uterine tracts, as well as with ovulation stage as obtained by analysis of ovaries. Males younger than 31 months and females younger than 20 months were eliminated to avoid bias due to low weights in immature specimens (LINDEMANN 1955). Age in months refer to an estimated birth date of May 15, based on information published by LINDEMANN (1956), HAGLUND (1966) and ZUCKERMANN (1952). Age was determined by means of incremental lines in tooth cementum (KVAM 1984).

Sexual maturation

To determine the age of sexual maturation, age was compared with weights of testes, ovaries and uterine tracts, and with reproductive status obtained from analysis of ovaries. Only specimens caught in the mating period, January through April (BIRKELAND 1971), were taken into consideration.

Results

Analysis of ovaries

In 104 females which had ovulated, the ovulation rate was 3.10 ± SE 0.16 (range: 1–10). Mean ovulation rate in 8 evidently pregnant females was 2.88 ± SD 0.64 (range: 2–4). Ovulation rates were not significantly different in pregnant and non pregnant females: U=3822.5, P=0.985 (Mann-Whitney test). In females over 2 years of age there were no significant differences concerning ovulation rates between age classes or between years of death (KVAM 1990).

Mating and parturition

A. Males: Weights of testes varied little throughout the year. There was a tendency to increased weights of testes in February through May. Individual differences within each month were significant, however. Lack of material from June throughout October was a great disavantage. The rutting season of the males could not be defined accurately based on this investigation (See Fig. 1).

B. Females: Weights of ovary were low in January and February, but a tendency to increase was observed from March throughout may. Weights of uterine tracts tended to remain constant throughout the year, however there was an obvious increase in March and April, culminating in a peak in May. A narrow mating period cannot be defined based on weights of ovaries and uterine tracts from such a small sample (94 ovaries and 119 uterine tracts).

The mating period seems to be rather prolonged. It starts in January, but the majority

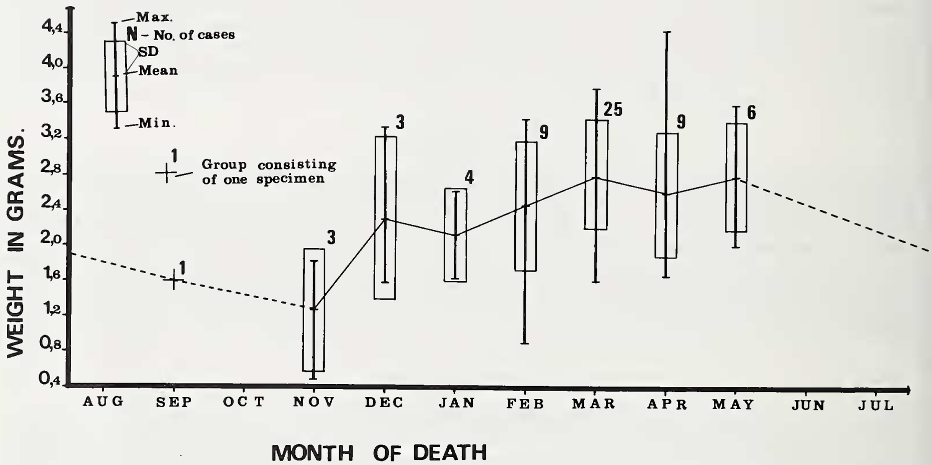

Fig. 1. Weight of the largest testicle in relation to month of death in males older than 31 months of age

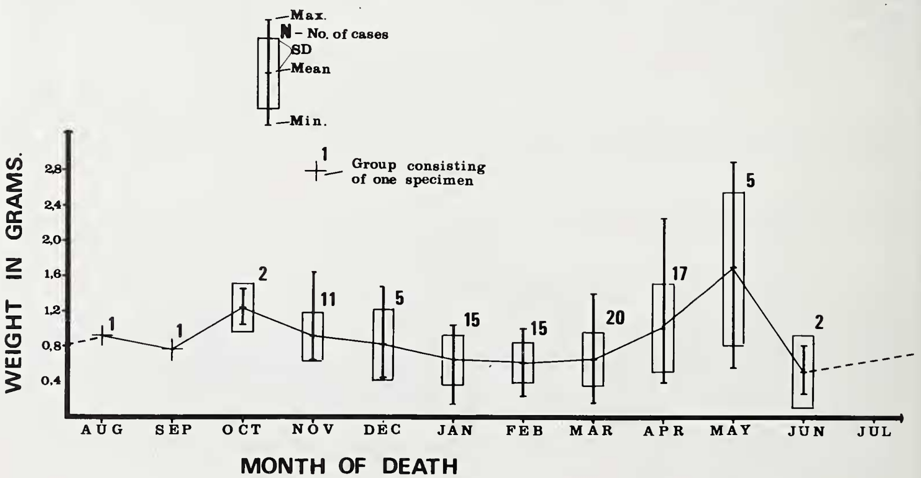

Fig. 2. Weight of the largest ovary in relation to month of death in females older than 20 months of age

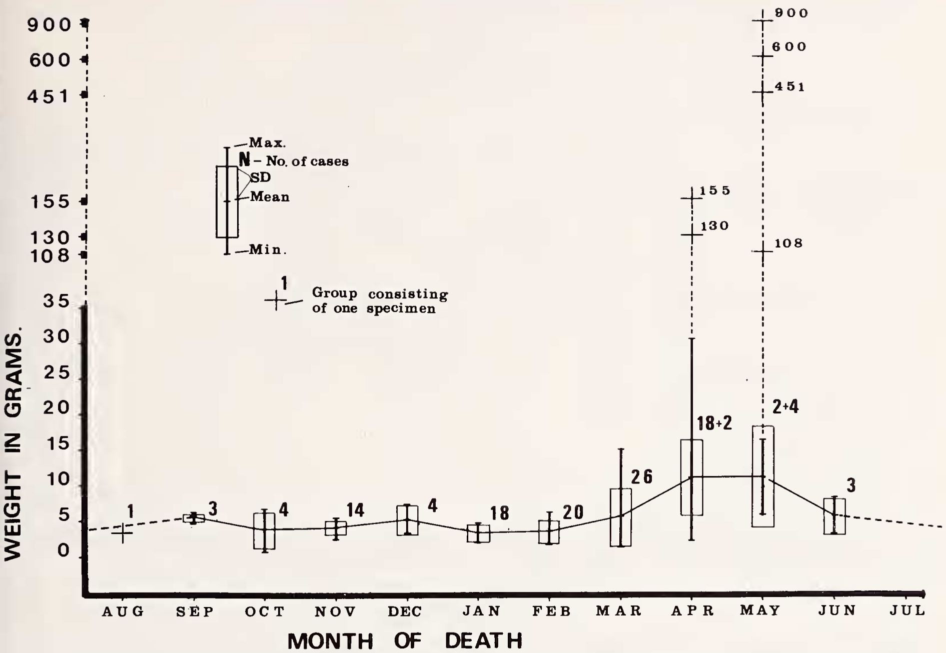

Fig. 3. Weight of uterine tract in relation to month of death in females older than 20 months of age

of ovulations seems to take place in February and March. In early April the season of heat appears to be over in most females (Tab. 1). Conception dates based on known date of shooting and approximate age of embryos are shown in Table 2. The conception period was estimated as March 21 through April 9 with a median conception date of March 25. The corresponding parturition period was May 29 through June 18, and median parturition date was June 3. Mean number of embryos in the 8 obviously pregnant uterine tracts was 2.50 ± SD 0.53. Range: 2–3 (Tab. 3).

Conclusion: All results concerning time of mating season, suggest February, March and early April. The data from the examined ovaries indicate mating tending to be spread throughout the indicated period of two to three months. Parturition seems to take place during late May or early June.

Sexual maturation

A. Males: Variation in testes weights within age classes was pronounced. (F=51.58, P=0.00, d.f.=4, N=86, One way procedure). A tendency to stabilize was noticeable from 2¾ years of age (Fig. 4). The age class ¾ years (7.5–11.5 months) showed significantly lower testes weights than all older age classes (P>0.05, Tukey test). Testes weights in the 1¾-year age class (19.5–23.5 months) were significantly lower than in males older than 3¾ years (P>0.005, Tukey test).

The low testes weights indicate that ¾-year-old males are usually immature.The 1¾-year-old (19.5–23.5 months) males with lowest testes weights are presumed to be immature. Most of 1¾-year-old males showed testes weights comparable with older age classes: Seven specimens (21.2 %) showed testes weights higher than 2.67 g, which was the mean testes weight in all older males. Thirteen specimens (52 %) showed testes weights higher than mean testes weight in all older males minus 1 SD (2.04 g). These animals were

Table 1. **Data on examined ovaries in relation to month of death in females older than 20 months of age**

Per cent values. No. of cases in brackets

Developmental status	Month of death				
	Jan.	Feb.	Mar.	Apr.	May–Dec.
No ovulation since last year's period of heat. No large follicles.	59 (10)	12 (2)	–	5 (1)	–
No ovulation since last year's period of heat. Follicles diam. > 1 mm.	18 (3)	18 (3)	5 (1)	–	–
Fresh luteal bodies from this year's period of heat. Large follicles. Diam. > 1 mm	6 (1)	18 (3)	40 (8)	10 (2)	13 (4)
Fresh luteal bodies from this year's period of heat. Graafian follicles.	–	6 (1)	5 (1)	–	–
Fresh luteal bodies from this year's period of heat. No large follicles.	18 (3)	47 (8)	50 (10)	85 (17)	87 (27)
	(17)	(17)	(20)	(20)	(31)

Table 2. **Estimated dates of conception on and birth dates for the fetus material, based on a 70-day gestation period**

Date of kill	Age in days	Estimated date of conception	Estimated date of birth
13 Apr	20	24 Mar	2 Jun
4 May	25	9 Apr	18 Jun
23 Apr	26–30	24 Mar–28 Mar	2 Jun– 6 Jun
4 Apr	26–30	28 Mar–01 Apr	6 Jun–10 Jun
1 May	35–42	20 Mar–27 Mar	29 May– 5 Jun
15 May	50	26 Mar	4 Jun
28 May	68	21 Mar	30 May
31 May	68	24 Mar	2 Jun

Table 3. **Crown-rump length and weight of fetus in European lynx, *L. l. lynx* from Norway of unknown age**

Age is etimated by comparison with a development table for Canada lynx, *L. l. subsolanus* and domestic cat *F. catus* presented by SAUNDERS (1961)

Estimated age in days after mating	Crown-rump length range (mm)	Weight[1] range (g)	Litter size
20	7.0–10.0	0.4	2
25	19.0–20.0	0.7–1.0	3
26–30	21.4–27.4	1.2–1.7	3
26–30	26.5–29.8	1.4–1.6	2
35–42	67.2	9.1–9.2	2
50	86.4–93.0	44.6–50.0	3
68	170.0–180.0	268.4–308.9	3
68	200.0	343.0–356.2	2

[1] Weight of individual embryos.

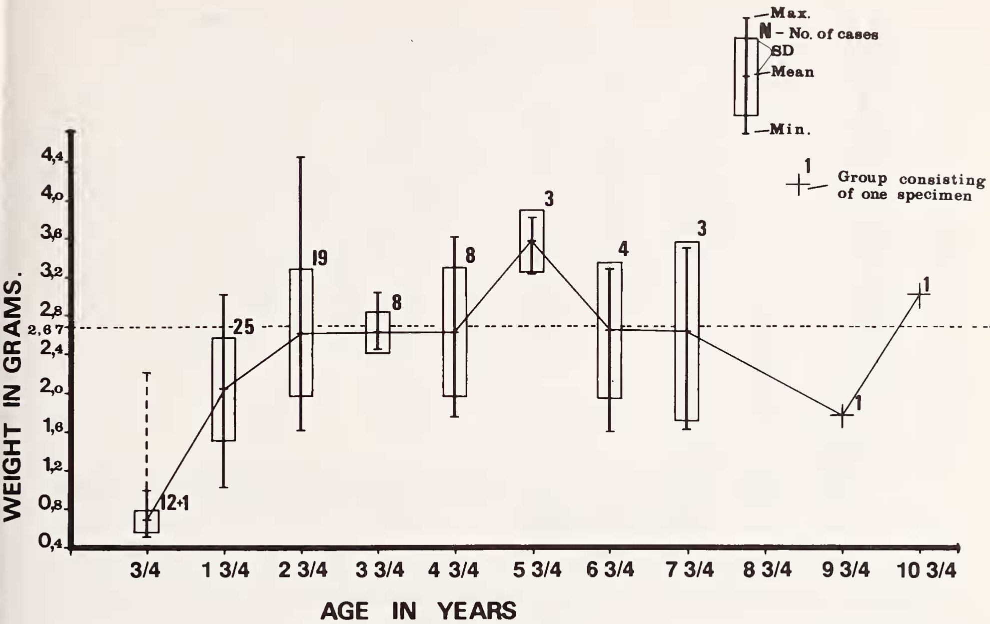

Fig. 4. Weight of the largest testicle related to age in males shot in the mating period (January throughout April). Mean weight of largest testicle in males older than 2¾ years is indicated by a dotted line

presumed to be fertile. 2¾-year-old males (31.5–35.5 months) do not differ significantly from older males, indicating 2¾-year-old males to be fully fertile.

Conclusions: The above outlined results thus indicate:

¾-year-old males (7.5–11.5 months): normally immature.

1¾-year-old males (19.5–23.5 months): approximately 50 % fertile.

2¾-year-old males (31.5–35.5 months): normally fertile.

B. Females: Variation in weights of ovary within age classes was pronounced (F=32.74, P=0.00, d.f.=4, N=81. One way procedure). ¾-year-old females showed stable and low values. There were significant differencs at the 0.05 level between ¾-year-old females and all older age classes (Tukey test). The 1¾-year-old females were different from the 3¾-year-old age class and the age class older than 3¾ years (P>0.05, Tukey test).

The largest ovary of No. 12/72 weighed 0.28 g, which was the lowest value recorded in 6-year-old females. This specimen was fertile, according to the ovary inspection record, even if weights of its largest ovary was comparable to the mean value in the ¾-year age class. This finding illustrates the danger to determine which females are fertile based on ovary weights alone. However, ovary weights can be of value to support results obtained by other methods.

¾-year-old females showed low weights and uterine tracts weights significantly different from uterine weights in older age-classes (P>0.05, Tukey test). Uterine weights in 1¾-year-old females were significantly different from uterine weights in all females older than 3¾ years (P>0.05, Tukey test). The minimum value in the 1¾-year age class was 1.38 g, but this specimen was immature. Between this minimum value and the second lowest uterine weight in immature 1¾-year-old females, uterine tracts of 6 specimens are recorded which, according to records from inspection of ovaries, were mature. All these values rank lower than mean weight plus 1 SD of the ¾-year age class. Maximum uterine weight in immature 1¾-year-old females was 3.34 g, which is comparable to the mean

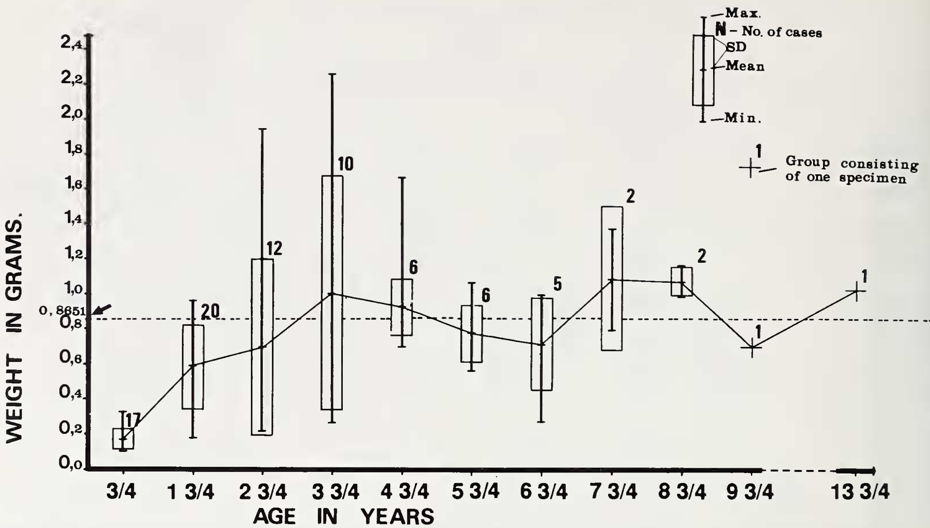

Fig. 5. Weight of the largest ovary related to age in females shot in the mating period (January throughout April). Mean weight of largest ovary in females older than 2¾ years is indicated by a dotted line

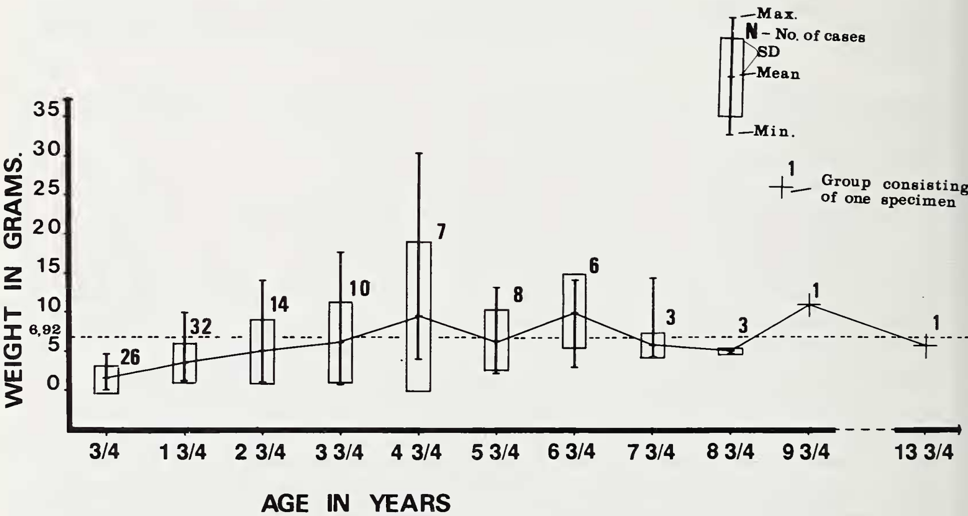

Fig. 6. Weight of uterine tract related to age in females shot in the mating period (January throughout April). Mean weight of uterine tract in females older than 2¾ years is indicated by a dotted line. Uterine tracts of two pregnant females shot in April were not included since their size was divergent from the remaining material

value of the age class. This implies that a female's maturity cannot be based on uterine weight alone, since mature and immature specimens overlap to a great extent.

The youngest female with luteal bodies was shot on April 4 at an age of 10.5 months. This specimen possessed 2 fresh luteal bodies, but its uterine tract was not turgid. Graafian follicles were detected in two ¾-year-old females. They were shot on April 4 to 9,

Table 4. **Age of sexual maturation in females given in percent based on examination of ovaries**
No. of cases in brackets

Maturation Age	Age in months				
	0–9,5	9,5–21,5	21,5–33,5	33,5–45,5	45,5–57,5
0	100 (24)	49 (17)	12 (3)	5 (1)	–
¾	–	51 (18)	28 (7)	14 (3)	–
1¾	–	–	48 (12)	43 (9)	–
2¾	–	–	–	33 (7)	–
3¾	–	–	–	–	6 (1)
1¾?	–	–	8 (2)	–	–
2¾?	–	–	4 (1)	5 (1)	69 (11)
3¾?	–	–	–	–	6 (1)
4¾?	–	–	–	–	19 (3)
Immature	100 (24)	49 (17)	12 (3)	5 (1)	–
Mature	–	51 (18)	88 (22)	95 (20)	100 (16)

0: Immature
¾: Maturation at ¾ years of age.
1¾: Maturation at 1¾ years of age.
2¾: Maturation at 2¾ years of age.
3¾: Maturation at 3¾ years of age.
1¾?: Mature at 1¾ years of age. Maturation age uncertain.
2¾?: Mature at 2¾ years of age. Maturation age uncertain.
3¾?: Mature at 3¾ years of age. Maturation age uncertain.
4¾?: Mature at 4¾ years of age. Maturation age uncertain.

respectively, at 10.5 months of age. Their uterine tracts were not turgid. This might indicate that females which are in heat in their first year of life (¾-years-old), tend to come into heat at the very end of the season.

Some females of older age classes have been labelled "Age of sexual maturation uncertain". The reason for this is that lutein bodies of more than 2 seasons of heat have been detected in only 8 cases. One cannot normally determine the whole reproduction history in the ovaries of females that have experienced more than two mating seasons.

Conclusion: The above-outlined results thus indicate that:

¾-year-old females (7.5–11.5 months): approximately 50 % fertile.
1¾-year-old females (19.5–23.5 months): normally fertile.

Discussion

Analysis of ovaries

As luteal bodies from three different cycles have been detected in eight cases, and all other mature females who had survived at last two mating seasons showed luteal bodies from two cycles, the obtained result is not divergent from findings in related species. Luteal bodies of bobcats *Lynx rufus* last the lifetime of the female (Crowe 1975). Saunders (1961) found luteal bodies from two cycles in the Canada lynx. Luteal bodies from different cycles were determined by methods similar to those employed in the present investigation. Luteal bodies in domestic cats persist for 6 to 8 months after mating (Dawson 1946).

Ovulation rates were stable in different age classes and in different years over a period of 17 years. This is not in correspondence with the results obtained by Brand and Keith (1979) concerning the Canada lynx of Alberta, which showed obvious cycles correlated to prey abundance. The reason for this difference may be a tendency in the European lynx for prey switching in correspondence with availability of different prey species. A similar tendency has not been found in the Canada lynx, which specializes on the snowshoe hare *Lepus americanus*. This phenomenon is discussed in more detail by KVAM (1990).

Ageing of embryos

Based on near kinship between the European lynx and the Canada lynx it appears reasonable to compare results from SAUNDERS (1961) for ageing the embryos. Ovaries of pregnant Canada lynx females examined by SAUNDERS were histologically in good condition, allowing comparison of lutein bodies with published data on the development of lutein bodies in the domestic cat. The relationship between development of lutein bodies and size of embryos in the domestic cat and Canada lynx was very similar for early stages of gestation. Since the cat embryos were of known age, SAUNDERS (1961) aged his embryos from Canada lynx by comparing crown-rump lengths and weights with data on the cat embryos. As support he refers to embryos in smaller- and larger-sized breeds of dogs, which do not usually differ in size until 40 days of a normal gestation period of 60–63 days. These assumption might support the hypothesis that embryonic development in the European lynx is also parallel to development of cat embryos in early stages of gestation, with the necessary reservation that two different species are compared in this case.

LINDEMANN (1955) reported birth weight of 69 g and 200 % wight gain from birth to 10 days of age in seven European lynx kittens from Poland raised in captivity. Kittens of two almost fully developed litters of the present material weighed from 268 g to 356 g. According to LINDEMANN (1955) lynx kittens should be 20 days old before reaching such weights. The present results correspond more closely with HUCHT-CIORGA (1988), who reported body weights in European lynx kittens from the Wuppertal zoo, West-Germany: 600 g at 8 days of age indicates a birth weight of approximately 200–300 g, assuming a 200 % weight gain after birth.

Litter size

LINDEMANN (1956) reported 1–4 kittens with a mode of 2 in Eastern Europe. OGNEV (1935) reported 2–3 kittens as normal in the Soviet Union. SATUNIN (1915) reported a maximum litter size of 3 in Caucasus. YABLONSKI (1905) considered a litter size of 4 as unusual. He reported in old Siberian hunter to have observed a litter of 5 on one occasion. SAUNDERS (1961) reported a mean litter size of 2.92, with a mode of 3 in Canada lynx from Newfoundland. VALVERDE (1957) reported a mean litter size of 2.5 with a mode of 2 in Spanish lynx *Lynx pardina*. The range was 1–4. The mean litter size of 2.50 ± SD 0.53 found in the present investigations is in keeping with the values obtained in other studies.

Gestation period

LINDEMANN (1956) stated a gestation period of 70–72 days in lynx from Eastern Europe. PALMGREN (1920) reported parturition on 20–23 May at Högholmen Zoological Garden, Helsinki, Finland. As mating occurred on March 6, this indicates the gestation to have lasted 75–78 days. OGNEV (1935) quoting older sources, reported 63–70 days gestation in European lynx of the Soviet Union. ZUCKERMAN (1952) calculated 63 days for captive lynx at London Zoo. STEFAN JONSSON (pers. comm.) states a gestation period of 65–70 days in his captive lynx at Tovetorp, Sweden. Based on these sources one might suppose a normal gestation period in European lynx of approximately 70 days. Some variation has to be expected, and one cannot be sure to have observed the very first copulation of a mating period in captive animals.

Mating period

According to VALVERDE (1957) and DELIBES et al. (1975) mating in the Spanish lynx takes place in January and February. WERNER (1953) reported mating during late February in European lynx from the Carpatians and Tatra mountains of Central Europe, while OGNEV (1935) reported March and early April as the normal mating period by lynx in central parts of the Soviet Union. In Caucasus mating is reported to take place in the same period or somewhat earlier. HAGLUND (1966) holds March as the normal mating period in European lynx from Northern Sweden. STEFAN JONSSON (pers. comm.) observed behaviour reflecting "heat" in captive lynx at Tovetorp, central Sweden in the period 25 February–8 April. This information might suggest a delay of the mating period with higher latitude. CROWE (1975) reported a similar pattern in the bobcat.

BIRKELAND (1971) claimed that mating in European lynx from Norway occurs from January 15 through April 15. This investigation supports BIRKELAND's results, indicating a peak of mating activity in March. HAGLUND (1966) suggested a mating period of approximately one month. According to EWER (1973) prolonged mating period is widespread in carnivores. One possible reason for this may be that strong, well armed and solitary living mates may require a certain time to calm down the aggression that close body contact would bring about outside the mating period.

Polyestrous status, and induced ovulation (ASDELL 1946, 1966; EWER 1973) are adaptations that would fit well with the solitary habits of the European lynx. No examined felid species has proved to be monoestrous (EWER 1973). The European lynx may therefore also be polyestrous, since the mating period is so prolonged. The present results do not, however, indicate the European lynx to be truly polyestrous and have more than one ovulation wave per season, as reported for the bobcat, which is also supposed to be a spontaneous ovulator (CROWE 1975). The ovulation rate of the 8 pregnant specimens of the present material corresponds very accurately with observed litter size. Also the low number of fresh corpora lutea and corpora lutea of previous cycles in specimens in their 1st and 2nd year of life indicate no more than one ovulation wave per season. The above outlined pattern fits well with a system of monoestrous status and induced ovulation. But as PERRY (1972) points out, there may not be a clear demarcation between spontaneous and induced ovulators in many cases. Just as spontaneous ovulation may sometimes occur in a species that normally ovulates only after coitus, the converse may be true in that coitus may induce or hasten ovulation in a species that normally ovulates spontaneously.

Parturition date

May 15 was employed as a normal parturition date in age determination of the present material, due to information published by LINDEMANN (1956). ZUCKERMANN (1952) reported birth on May 10 in the London Zoo, and PALMGREN (1920) reported May 20–23 in Högholmen Zoo, Helsinki, Finland. HAGLUND (1966) mentioned a lynx litter observed on May 21. The kittens were estimated to be 12 days old, which means that parturition occurred on May 9. COLLETT (1912) supposed normal parturition in May or June, in some instances even later. Supposed occasional late parturition is reported based on observations of two litters of approximately two weeks of age on 2 and 15 July. The results obtainded in the present study concerning parturition period are in good correspondence with recent data from Tovetorp and Grimsö research stations of Sweden, where the following parturition dates are reported for captive lynxes: 1974: 26 May; 1976: 23 May, 3 June, 6 June; 1977: 18 May, 6 June, 18 June; 1978: 15 May (STEFAN JONSSON, pers. comm.). Since the mating period is rather prolonged and tends to be delayed with higher latitude, parturition will also vary accordingly.

Sexual maturation

LINDEMANN (1955) reported sexual maturation in male European lynx at 33 months or nearly 3 years of age. HAGLUND (1966) and BIRKELAND (1971) quote LINDEMANN without further comments. SAUNDERS (1961) reported male Canada lynx to be sexually immature in their first year of life. His material gave no reliable data on age of maturation. The present investigation demonstrates maturation at 2¾ years of age as a general rule. The results indicate maturation in approximately 50 % of the 1¾-year-old males. But more testes in histologically acceptable condition from this age class will be necessary to draw any definitive conclusions concerning maturation in 1¾-year-old males. According to WERNER (1953) female lynx aggregate at certain mating grounds to court one large older male. Younger males gather around and fight for those females which are chased away by more dominant females. YABLONSKI (1905, quoted OGNEV 1935), who studied the lynx of the Altai mountains in Siberia, reported males chasing the females and fighting for them. This is in correspondence with well known domestic feline habits. Any of these mating systems would lead to low probability for 1¾-year-old mature males to take part in mating. They would most likely be chased away by stronger 2¾-year-old males. The result would be normal mating from 2¾ years of age because of behavioural, and not only physiological reasons.

LINDEMANN (1955) reported sexual maturity in captive female European lynx at 21 months of age. HAGLUND (1966) quoted LINDEMANN without further comment. SAUNDERS (1961) gave the same maturation age in female Canada lynx from Newfoundland. This is in correspondence with results obtained in the present investigation concerning the general rule. However, the present study also indicates maturition in some females in their 1st year of life. Although ovulation in the European lynx may be assumed to be induced by coitus, as in the domestic cat (ASDELL 1946, 1966), lutein bodies do not necessarily imply pregnancy. According to GREULICH (1934) ovulation in domestic cats can be caused artificially by means of a glass rod. This indicates that attempted mating or playing might induce ovulatiion. As a consequence, ¾-year-old sexually mature females, as established by ovary inspection, might not necessarily take full part in reproduction, although they display luteal bodies of recent ovulations. Should they participate and conceive, there is considerable reason to question their ability to raise their young, which would be born shortly after the mother has become able to kill prey and feed herself (JONNSON 1978, 1986).

Acknowledgement

I am indebted to Mr. STEFAN JONNSON for his valuable information on reproduction in captive lynx in Sweden.

Zusammenfassung

Fortpflanzung beim europäischen Luchs, Lynx lynx

Untersucht wurden die fixierten Gonaden von 325 in den Jahren 1960–1976 in Norwegen gesammelten Luchsen. Danach dauert die Paarungszeit von Februar bis Anfang April und hat ihren Höhepunkt im März. Die Jungen werden von Ende Mai bis Anfang Juni geboren. Die Wurfgröße beträgt gewöhnlich 2–3. Die Männchen erreichen meist im Alter von 2¾ Jahren die Geschlechtsreife, einige schon mit 2¾ Jahren. Die Weibchen sind mit 1¾ Jahren fortpflanzungsfähig, Anzeichen für eine Geschlechtsreife bereits im Alter von ¾ Jahren fanden sich bereits bei etwa 50 % der Weibchen.

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